October 15, 2001*

Federal Reserve Bank of Cleveland

The Demographics of Inflation Opinion Surveys

by Michael F. Bryan and Guhan Venkatu

"Price stability means that expected *changes in the average price level… do not materially enter business and household financial decisions."*

—Federal Reserve Chairman Alan Greenspan (1989)[1]

Suppose your employer offers you a contract that promises a 5 percent raise next year. Would you accept? To evaluate the agreement, you need to predict next year's inflation. If you expect 6 percent inflation, you would probably decline the offer, because it means your inflation-adjusted, or "real" income, will drop 1 percent. But if you expect only 2 percent inflation, the 3 percent increase in your real income might be enough to persuade you to agree. In other words, economic decisions are based on the *real* value of things, and therefore, if economists hope to understand the behavior of the marketplace, we must see through nominal values to the "real" returns on which monetary decisions are actually made.

But an accurate gauge of inflation expectations is more than an academic interest. It is an important object of central bank policy. The potential for inflation introduces an added risk into all monetary decisions that a risk-averse public will seek to protect itself against. For example, banks will add an inflation "risk premium" into interest rate calculations, workers will negotiate "cost-of-living" provisions into their labor agreements, and investors will allocate their resources in favor of assets whose values are less sensitive to inflation erosion. All of these defensive actions involve costs that are unnecessary in a world secure from inflation. It is for this reason that the Federal Reserve's stated objective, as Chairman Greenspan's quote suggests, is about more than eliminating inflation; it is also about eliminating the *expectation* of inflation.

The straightforward way to judge public inflation expectations is to go out and ask people, and in fact, a few surveys do exactly that. But many economists question the reliability of survey-based measures of public inflation expectations; as a result, frustrated academics and policymakers have turned to indirect measures of the public's inflation sentiment, like the behavior of asset prices, economists' forecasts, and past inflation trends. Failure to directly assess the public's inflation expectations has left a gap in economists' ability to easily separate nominal from real values and has obscured an important variable in the deliberations of the central bank.

Three years ago, the Federal Reserve Bank of Cleveland, in association with the Ohio State University, began to investigate the inflation sentiment of Ohioans using survey data. This effort has uncovered an intriguing result. Survey-based estimates of inflation sentiment are dramatically and systematically influenced by the demographic characteristics of the respondent. Income, education, age, race, and gender are all strongly correlated with respondents' perceptions of inflation and their forecast of future inflation. We believe this finding provides an important clue in understanding inflation opinion surveys.

And the Survey Says…

Why aren't surveys of the public's inflation expectations taken more seriously? The problem is that if you simply ask people what course they expect inflation to take, the average response does not track the realized inflation data very closely.

In this *Commentary*, we document that people report very different perceptions and predictions of inflation depending upon their income, education, age, race, and gender—a strange finding that may provide an important clue to understanding how to interpret survey data of inflation expectations.

Some researchers have found that people repeatedly make the same errors in their inflation predictions, often expecting inflation to be higher than it turns out to be. And others find that people appear to ignore readily available information that would help improve the accuracy of their forecasts.[2] In short, people's inflation expectations do not appear to be "rational."

The most respected survey of household attitudes is conducted by the University of Michigan's Survey Research Center, which has tracked the inflation predictions of U.S. households for more than 50 years. The problem with the survey's measure of inflation expectations can be readily seen in figure 1. If we consider a period over which inflation was relatively constant (1990 to 1999), the Michigan survey shows that average (or "mean") household inflation expectations persistently exceeded inflation as measured by the Consumer Price Index (CPI). Over this period, people predicted 4.1 percent inflation on average—more than a percentage point above the CPI's actual reading (3.0 percent).

Why these survey data are commonly wide of the mark and frequently higher than the official inflation estimates is unknown. Some economists suggest that

ISSN 0428-1276
*Printed January 2002

households have no incentive to answer the question correctly, and therefore may not answer the survey with much care. But this isn't a very satisfying answer. It suggests that respondents are not telling the truth or they have no well-formed outlook on inflation. But if people don't have well-formed expectations about inflation, on what basis do they make monetary decisions?

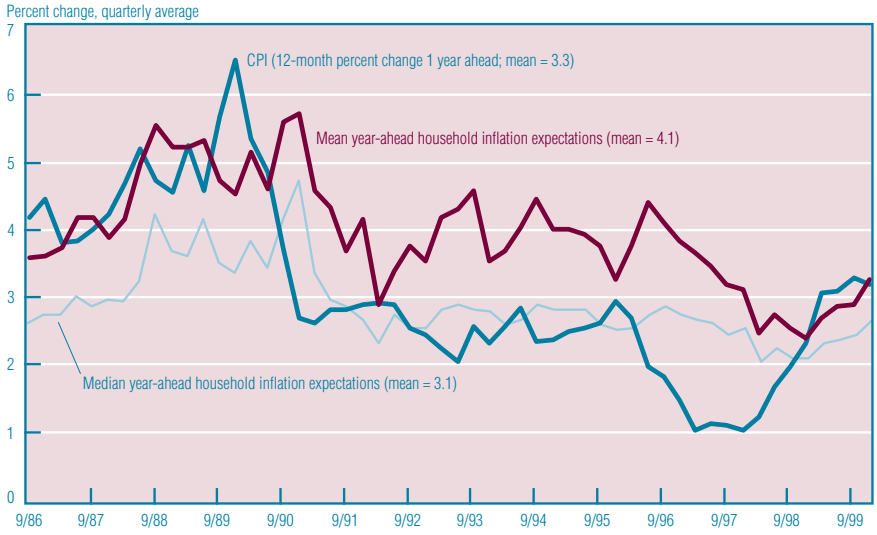
Others take an even more extreme position, suggesting that people hold irrational views about inflation. If true, this conclusion calls into question virtually every economic decision made by the public and effectively demolishes the models that economists and policymakers use to understand the behavior of the marketplace. Clearly, a more thorough study of household responses to inflation expectation surveys is needed.

Prediction or Perception?

Since August 1998, the Federal Reserve Bank of Cleveland and the Ohio State University have conducted a monthly telephone survey of a representative sample of Ohioans. Using language similar to the University of Michigan's survey, we ask how much the respondent expects prices to rise (or fall) over the next 12 months (see inset for an overview of the survey). The average expectation for inflation for the first 28 months of our survey was 5.2 percent, a high estimate compared to the inflation recorded by the CPI—about 3.1 percent. This seemingly large "overestimate" is largely consistent with our earlier findings using the University of Michigan survey.

We begin our investigation of this puzzle with a rather crude reality check, by questioning respondents about their *perception* of price increases that have already occurred. That is, we ask our sample of Ohioans how much they think prices rose over the *past* 12 months. To our surprise, respondents say inflation was about 6 percent on average over the 40 months of our survey; the average increase in the CPI over the same period, however, was only 2.7 percent, which means they overestimated past inflation even more than they did future inflation. So the public's apparent high expectation of future inflation may not tell us anything about people's predictive abilities, but rather how they perceive actual price movements.

FIGURE 1 INFLATION EXPECTATIONS: SURVEY DATA VERSUS THE CPI



SOURCES: U.S. Department of Labor, Bureau of Labor Statistics; and University of Michigan, *Survey of Consumers*.

The Importance of Demographics

We next consider whether everyone perceives inflation to be significantly above the official data or whether only a subset of the population does. Table 1 provides an answer to that question by reporting average inflation perceptions and expectations for a number of demographic groups. What stands out in the data is the large disparity in the inflation estimates of different groups of people. For example, respondents in the lowest income quintile (the bottom 20 percent of all incomes) say inflation was twice as high as respondents in the highest income quintile (4.5 percentage points higher!). Similarly, younger (18 to 25 years) respondents say inflation was higher than their middle-aged counterparts, single respondents say it was higher than those who are married, nonwhites say it was higher than whites, and women say it was higher than men.[3]

A closer look at the responses within these specific groups is also informative. The differences in inflation sentiment between groups does not appear to be merely a product of a few extreme views, but rather a relatively widely shared perspective within each group. The variability of expectations (as measured by the standard deviation of the responses) does not change much across groups. Neither do there seem to be more outliers in one group compared to any others (as measured by comparing the skewness of each group's responses).

All of these various demographic qualities are related, of course. For example, that inflation perceptions and predictions fall with educational attainment is certain to be related to the finding that inflation perceptions and predictions fall as income grows, since people with less education also tend to be people with lower incomes.

To disentangle related demographic qualities, we conducted statistical tests that allow us to isolate the influence of each demographic characteristic on the inflation prediction of the respondent, using the University of Michigan survey data. We find that virtually *all* of the demographic characteristics we examined tend to be correlated with the respondent's inflation prediction. In table 1 we report the net influence of various demographic characteristics as a deviation from the baseline of a married, middle-aged, white male with some college, who is in the middle income quintile (the middle 20 percent of incomes). Respondents in the low income quintile hold inflation expectations that are about a percentage point above those in the reference group. Those in the highest income quintile expect about a half percent lower inflation. Respondents with less than a high school education tend to predict about 1 percent more inflation per year than respondents with more than a high school degree. Young respondents expect about half a percentage point more inflation than middle-aged respondents, white respondents

TABLE 1 MEAN INFLATION PERCEPTIONS AND EXPECTATIONS BY SELECTED DEMOGRAPHIC GROUP

	Perceptions[a]		Expectations		
	Mean	Standard deviation/ skewness	Mean[a]	Standard deviation/ skewness[a]	Percentage point deviation from reference group[b,c]
Full sample	**5.9**	**10.6/4.2**	**5.4**	**9.3/4.5**	–
Male	4.6	9.1/4.6	4.0	6.7/3.3	r
Female	6.9	11.5/4.0	6.4	10.7/4.4	1.0
White	5.6	9.9/4.5	5.0	8.5/5.5	r
Nonwhite	7.9	14.4/3.2	7.7	13.0/2.1	1.0
Single	6.7	11.7/3.2	6.0	10.3/2.5	–0.2
Married	5.4	9.7/5.4	4.9	8.3/7.2	r
Elementary school	8.7	12.6/2.7	7.4	11.4/1.8	1.1
Some high school	7.5	12.2/3.3	6.6	10.7/3.0	0.7
More than high school	4.8	9.0/5.7	4.4	7.8/7.1	r
Low income	9.2	14.5/2.4	8.4	13.7/2.8	1.1
Low-middle income	7.4	11.4/2.8	6.3	9.8/2.3	0.4
Middle income	6.0	9.7/3.5	5.3	8.3/2.7	r
High-middle income	4.7	8.5/4.9	4.4	6.9/2.6	–0.2
High income	4.7	9.8/6.9	4.4	8.4/9.0	–0.4
18–25 years old	6.8	11.2/2.5	6.4	10.4/1.9	0.6
26–35 years old	5.5	10.6/4.2	5.2	8.9/3.1	0.3
36–45 years old	5.6	10.3/4.1	5.4	9.3/3.2	0.2
46–55 years old	5.3	9.8/8.5	5.2	8.1/3.1	r
56–65 years old	6.0	11.0/3.3	5.3	8.5/3.3	–0.3
>65 years old	7.1	11.2/2.7	5.1	10.6/9.4	–0.5

a. *FRBC/OSU Inflation Psychology Survey,* August 1998–November 2001.
b. University of Michigan, *Survey of Consumers*, June 1986–December 1999.
c. The reference group, white, married, male, with some or all college, in the middle income quintile, and aged 46–55, is denoted by "r." All results are significant at the 99 percent confidence level.
SOURCES: *FRBC/OSU Inflation Psychology Survey*; University of Michigan, *Survey of Consumers*; and authors' calculations.

THE FRBC/OSU INFLATION PSYCHOLOGY SURVEY

The *Inflation Psychology Survey* is part of the larger *Buckeye State Poll*, which has been conducted monthly since November 1996 by the Ohio State University College of Social and Behavioral Sciences Survey Research Unit. The poll asks at least 500 randomly selected Ohio households a number of questions about their confidence in the U.S. economy and economic conditions. In August 1998, four questions on inflation perceptions and expectations were added. These constitute the *Inflation Psychology Survey*:

- During the last 12 months, do you think that prices in general went up, or went down, or stayed the same?
- By about what percent do you think prices went up (down), on the average, during the last 12 months?
- During the next 12 months, do you think that prices in general will go up, or go down, or stay the same?
- By about what percent do you think prices will increase (decrease), on the average, over the next 12 months?

about 1 percent less than nonwhites, and women about 1 percent more than men.[4]

We believe this finding is the basis for why some researchers who use Michigan survey data on inflation expectations have tended to focus on the "median" survey response rather than the "mean" response.[5] Although the two survey estimators mirror one another closely, the median has averaged about 1 percentage point less than the mean (figure 1). Since the median tracks the CPI more closely, some say it represents a "better" measure of the public's inflation expectations. This may be true. But our research sheds some light on this conclusion. We now know that the median response effectively reduces the influence of certain demographic groups when we tally up the responses. Simply, the median response disproportionately cuts out the inflation expectations reported by lower-income, less-educated, nonwhite, and female respondents.

Different People, Different Inflation?

Could it be that the costs of the different market baskets these various groups purchase are sufficiently dissimilar in their growth that the disparate views of inflation are all accurate reflections taken from different perspectives? If so, this might explain why the survey responses do not align closely with the CPI. This is because the CPI is an expenditure-weighted price index. This means that the CPI's market basket is implicitly weighted toward the spending habits of higher-income, better-educated, middle-aged people and away from the spending habits of the demographic group that represents the average survey respondent.

However, a recent study by an economist at the Bureau of Labor Statistics (the agency responsible for constructing the CPI), shows that reweighting the CPI on the basis of population demographics, rather than expenditure shares, has only a marginal influence on the recorded inflation rate.[6] Specifically, while the expenditure-weighted CPI averaged 3.27 percent over the 1987–97 period, the population-weighted statistic averaged 3.33 percent—a fairly small difference. In other words, the rise in the cost of living experienced by people in different demographic groups appears to be much too small to explain why they report such different inflation sentiments.

What We (Don't) Know

What we now know is this: People in different demographic groups report persistently different expectations about inflation. Moreover, these expectations appear to be less a function of how well people forecast inflation and more a matter of how they perceive it. That is, different people *perceive* price movements differently—much differently.

What we still don't know is why. If the prices of things purchased by men, high-income, middle-aged, or married people don't *persistently* rise less than the things bought by women, low-income, older, or single people, why would such groups say they do?

What's at stake here is quite important because it suggests the potential for large variations in the "real" values different groups envision. For example, if groups with lower incomes really do perceive inflation to be much higher than higher-income groups, it suggests that their expected real return to saving is also much lower. Perhaps this curious finding can help to explain why such groups tend to save disproportionately less than their richer counterparts. But such conclusions are premature. Before we can make any definitive statement about the implications of the widely different inflation predictions we see across demographic groups, we must have a better appreciation of the factors that give rise to them.

Footnotes

1. *Monetary Policy Report to Congress*, February 21, 1989 (emphasis added by authors).

2. A good overview of these issues can be found in Dean Croushore, "Inflation Forecasts: How Good Are They?" Federal Reserve Bank of Philadelphia, *Business Review*, May/June, 1996.

3. For a more thorough discussion of the differences by gender, see Michael F. Bryan and Guhan Venkatu, "The Curiously Different Inflation Perspectives of Men and Women," Federal Reserve Bank of Cleveland, *Economic Commentary*, November 2001.

4. These tests also reveal that once we account for other demographic characteristics, single respondents hold slightly smaller inflation expectations than the reference respondent (0.2 percentage point less.) That is, single people's somewhat high inflation expectations appear to be largely a function of their income and age and not that they are unmarried.

5. See, for example, Lloyd B. Thomas, "Survey Measures of Expected U.S. Inflation," *Journal of Economic Perspectives*, vol. 13, no. 4 (Fall 1999), pp. 125–44.

6. See Mary Kokoski, "Alternative CPI Aggregations: Two Approaches," *Monthly Labor Review*, vol. 123, no. 11 (November 2000), pp. 31–39.

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Economic Commentary *is published by the Research Department of the Federal Reserve Bank of Cleveland. To receive copies or to be placed on the mailing list, e-mail your request to* 4d.subscriptions@clev.frb.org *or fax it to* 216-579-3050. Economic Commentary *is also available at the Cleveland Fed's site on the World Wide Web:* www.clev.frb.org/research, *where glossaries of terms are provided.*

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